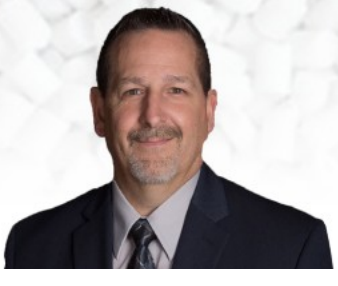
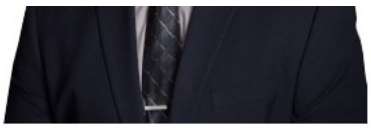
COLOR & APPEARANCE

CAD NEWS®

FALL 2021 NEWSLETTER



FALL 2021 CHAIRMAN'S



MESSAGE

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Hello and let me first express my sincere appreciation f
being this year's Chairperson and looking forward to th
challenges this position holds.

I would like to start off by thinking Mark Freshwater for

We have been through many changes both physically and emotionally over the last 18 months or so and just going through the daily ups and downs is so draining. We have seen supply chain disruptions throughout all industries and plastics is most definitely not been left unscathed. Everyone dealing with it in their own ways but as an industry we will pull through stronger and more versatile than ever.

This Spring the Membership of CAD voted in two new members to the CAD Board of Directors and re-elected 7 incumbents. We want to welcome in Brian Coleman and Josh Jacobs to the BOD. A list of the election results can be found in this issue.

As always, we would like to thank the sponsors of this year's RETEC. These sponsorships are what allows us to put on the RETEC conference as well as give scholarships to college students and support programs like the Plastivan. All successful because of the support of these sponsors. They are recognized in this issue so please use the links and find out more of what they do for our Membership.

I would also like to thank the sponsors of the Newsletter for their continued support of the Newsletter so please visit their websites and find out more of what they can

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ANNUAL SPE CAD SURVEY RAFFLE

We are looking for gifts to use for the SPE CAD Survey Raffle that will be given away at the end of the conferenc

proceedings. If you have a prize of $25 or more and want to supply for the raffle, please contact:

Chuck DePew or +1 765-914-3363

INVITATION TO ATTEND CAD BOARD MEETING

The Color and Appearance Division (CAD) holds 4 Board of Directors (BOD) meetings each year, in person or virtually. Any CAD members in good standing with in SPE and has Color and Appea as their selected division are welcomed to attend these meetings. If interested in attending the meetings, please contact the current CAD Chairperson or any BOD for more information.

The year 2019 marked a major step forward, with the introduction of both its

providing the stories behind the inspi- ration and motivation driving their pop- ularity. Brand owners can leverage this

From the R&D lab to the produ floor, Milliken's Chemical Division st ready to help customers leverage

CAD RETEC® 2021 Spons

Registration fees for attendees are kep part by the generous donations of corpo individual sponsors. We'd like to say a thanks to these generous sponso recognize their support of the con Watch for sponsorship signs duri conference to see which event each companies below sponsored.

Platinum Sponsors

Pre-registration online Go to [2021 CAD RETEC HOME]

Color On My Mind
CAD RETEC® 2021

Onsite Registration

- Sunday 19 September 1:00 PM – 7:00 PM
- Monday 20 September 7:30 AM – 5:00 PM
- Tuesday 21 September 7:30 AM – 3:00 PM

Preconference Tutorial *Coloring of Plastics*

Presented by Bruce Mulholland, SPE Fellow
Sunday 19th September 8:00 AM – 4:30 PM

Fee: $525 (Must Pre-register for event. Extra fee not included with CAD RETEC® 2021 regist

CAD RETEC® 2021 Golf Outing

Sunday September 19th, 2021
Bears Best Atlanta

spe CAD RETEC®
Atlanta, Georgia • September 19-22, 2021
Presented by SPE Color and Appearance Division

(SELECT ONLY ONE TYPE OF REGISTRATION)

SPE Member	**2021**
❑ Advance	$410
❑ Late / Onsite (After 8/20/21)	$510
SPE Non-Member:	
❑ Advance	$630
❑ Late/Onsite (After 8/20/21)	$730
OTHER Registration Types:	
❑ Speakers/Moderator	$190
❑ Student (w/ Valid Student ID):	$ 50
❑ Emeritus:	$100
❑ Tabletop advanced registration	$1,350

- Tabletop advanced registration $1,950
- Tabletop late reg (After 8/20/21) $1,550

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Atlanta, Georgia • September 19-21, 2021
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Color On My Mind
CAD RETEC® 2021

WELCOME RECEPTION

Sponsored by: SPE CAD

Atrium A703 – A704

Sunday, September 19th
6:00pm – 8:00pm

Join us for cocktails, networking, light snacks.

Complimentary with Registration

Use the GREEN drink tickets.

5K Fun Run/Walk

To benefit Habitat for Humani

Tuesday, September 21st
Marriott Marquis Lobby at 7:00am

Start your Tuesday morning off right. Join
bright and early for a fun run/walk through
city of Atlanta.
You'll be back in time to catch the first pap

EVENT COORDINATOR: Ashley Mill
EVENT SPONSOR: DCL

Free T-Shirt
for the first
40 runners

Cost: $
CAD will m
your donati

Exhibit Schedule

Atrium Ballroom B & C

Monday, Sep 20th
10:00 am to 7:00 pm

Monday Breakfast

Sponsored by DCL

Atrium A703 – A704

Monday, September 20th
7:00am

Complimentary with registration!

Networking Recepti

Sponsored by Shepherd C

Atrium Ballroom B &

Monday, Sep 20th
5:30 pm – 7:00 pm

Use the GOLD tickets for dr

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Color On My

CAD RETEC® 2

Technical Program, Atrium A

Monday 20 September 2021

Time	Category	Speaker/Company	Title/Sponsor
7:00-8:00 AM	Breakfast	Atrium A703-A704	Sponsored by DCL

8:45 AM	Opening Remarks	Kim Williamson / Techmer PM	*Welcome to CAD RETEC® 2021 i GA*
9:00 AM	Keynote	Doreen Becker / Ampacet	*Sustainability for Colors 2.0*
9:30 AM	Paper	Nathan Karszes / Ferro	*Leveraging Pigments' NIR Reflec Properties to Overcome the Cha Sorting Recyclable Black Plastics*
10:00 AM	**Break**	**Exhibits open (Exhibitors) Atrium Ballroom B & C**	***Sponsored by Clariant Colora Solutions***
10:30 AM	Paper	Frank Neuber / Clariant	*Fully Sustainable Micronized Wa Improve Dispersion in Engineeri Polymers*
11:00 AM	Paper	Eric Andrews / Colour Synthesis Solutions	*Evaluating the Influence of Colo Plastic Additives & Degradation*

Technical Program, Gold Room

Tuesday 21 September 2021

Time	Category	Speaker/Company	Title/Sponsor
7:00 AM	**Activity**	**Fun Run/Walk Hotel lobby**	***Sponsored by DCL***
8:45 AM	Opening Remarks	Kim Williamson / Techmer PM	*Welcome Day 2*
9:00 AM	Paper	Andrew Yankosky / Sun Chemical	*Pigment Lightfastness - A Comparison of Fluorescent Bulb (Fluorescent Deluxe Da and Light Emitting Diode Array (LED) Exp*
9:30 AM	Paper	Fang Wang / Sun Chemical	*Pigment Dispersion Quality Assessment a Application Suitability Analysis*
10:00 AM	**Break**	**Exhibit Area Atrium Ballroom B & C**	***Sponsored by EMD Electronics***
10:30 AM	Paper	Joseph Fay / BASF	*Maintaining Outdoor Plastics Appearanc UVA's or Both? Or Nothing?*
11:00 AM	Paper	Thomas R. Maier / Monolith	*The New Plasma Black: Performance and Environmental Benefit*
11:30 PM	**Luncheon**	**Awards Luncheon Atrium A703 – A704**	***Sponsored by Tronox***

New Technology Forum
Monday 20 September 2021

Time	Company
4:35	Milliken
4:40	Colour Synthesis
4:45	The Shepherd Color Company
4:50	Tronox
4:55	Datacolor
5:00	Sudarshan
5:05	Clariant
5:10	DCL Corporation
5:15	Birla Carbon
5:20	Silberline
5:25	EMD Electronics
5:30	Sun Chemical

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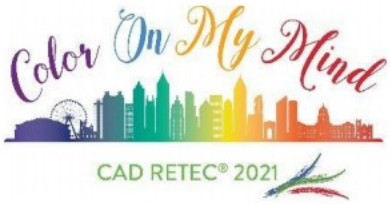

CAD RETEC® 2021 Exhibitors

Company	Company
3V Sigma USA	Leistritz Extrusion
Barentz	Liberty Specialty Chemicals
Birla Carbon	Lintech International LLC
CW Brabender	Milliken & Company
Cathay Industries USA	MIXACO USA
CINIC America	Omya
Clariant Colorants Solutions	Palmer Holland Inc.
Colour Synthesis Solutions	Paramount Colors Inc.

Datacolor	Royce Global
DCL Corporation	Silberline
Eckart America	Spectra Dyestuff Inc.
EMD Electronics	Sudarshan North America

SOCIETY OF PLASTICS ENGINEERS

2021 CAD RETEC® GOLF OUTING

SUNDAY 09.19.2021

Bear's Best
Atlanta

BEAR'S BEST ATLANTA
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FROM SCIENCE TO SHINE

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DESIGING FOR SUSTAINABILITY: A Case Study with Appearance Ny

Abstract

Material selection during the design phase can dictate a final part's ability to be recycled This paper looks at an appearance part that transformed three different material solution single material solution such that the final part was now recyclable and produced at lowe A look at the technical challenges and solutions to achieve this result is included.

Background: Initial Design

In many cases, designers and part engineers select materials based on past successful minimize risk. Their selection can be based on material properties themselves, past part mance, ease of applying secondary operations, or other factors. The part design as the of this paper was no exception.

The specific part discussed in this paper was a new engine badge design for the 2019 m year Ford F-150 Raptor pickup truck. The newly designed engine cover would include lo

Figure 1

Figure 2

Figure 3

Figure 4

Sustainability

This paper by no means is intended to be a dissertation on plastics sustainability. There is much published on recycling and re-use, or biopolymers, or compostable

Design for Sustainability

As mentioned earlier, the initial design of this badge has two different materials and three di secondary processes making the part not conducive

To eliminate the complexity of the initial design, the concept employed was to produce all three components from the same molded-in-color resin. This would eliminate the three secondary operations and would lower the final part cost. Because this part is under the hood, PA6 was chosen as the base resin for good thermal stability, good colorability, and good overall aesthetics for this appearance part. The remainder of this paper discusses the technical challenges and solutions to achieve the red letters, the silver letters, and the brushed bronze base plate appearance all produced from the same resin.

Paint Elimination: Red Letters

At the outset, formulating a precolored PA6 in red for the letters to spell "Performance" doesn't sound too challenging. The two main material requirements are initial color quality and resistance to discoloration over time due to heat of the engine. In PA6, the two main formulation elements to achieve these criteria are colorant selection and base resin heat stabilizer formulation.

Colorant selection is relatively straightforward for this application. The desired color is a high chroma race red color. With the color stability requirement, we quickly ruled out dyes for this application and were left with only a few options of high performance organic pigments to choose from. Having made this selection, color formulation was quickly completed to achieve the desired paint color.

For color stability of PA6 in high temperature environments, it is well known that typical inorganic heat stabilizer systems based on copper iodine additives will lead to objectionable color change after exposure. Color

Fortunately, much work had been undertaken in resins like acetal copolymer to improve the appearan molded-in-color metallic to reduce visible weld lines increase the reflectance of the color[1]. This was achi through pigment technology, and mold design processing. Aluminum pigments are available in forms: cornflake, lenticular (silver dollar), and sphe Corn flake pigments are characterized by a flat pig geometry with an irregular edge. Lenticular pigments flatter geometry with a smooth edge. Lenticular pigm are generally brighter than corn flakes due to the smo flat surface. Spherical pigments are round and contr more sparkle effect than true metal effect.

Another important aspect of aluminum pigmer particle size distribution. A broad particle size distrib flake will appear duller in color than the same av particle size product with a narrow distribution. In ge smaller particle size flakes will yield a more chrome appearance and have increased opacity. Larger flakes have a more sparkle appearance with less opacity.

Flow lines or knit lines occur when two pa polymer flow fronts come together in a part. Weld occur when polymer flow fronts meet head-on. These defects are present due to the part design and gate loc and occur in uncolored or colored resins. Surface de may not be present with those materials, but prop may be reduced due to the flow and weld lines. Me pigments generally create noticeable flow and weld causing surface defects. Orientation of metallic flake change the reflectivity making the flow or weld line noticeable. Larger particle size pigments generally ex less noticeable flow and weld lines. A broader particle

Metal Replacement: Base Plate

The final component of this engine badge assembly to replace with PA6 was the aluminum base plate. This part was anodized with a bronze color and also had a brushed surface appearance. A complicating factor was that the base plate included irregular holes throughout the surface which could cause flow lines. The holes were irregular in size, shape and direction. The holes are used for heat staking the letters to the base plate. The random nature of the holes is used as a poka-yoke so that the letters can not be interchanged to inadvertently misspell the words. The holes were obviously important for attaching the letters to the base plate. It was also important to maintain some level of mistake proofing, particularly for the word "Performance".

The base resin was again chosen to be PA6 with the same optimized organic heat stabilizer package used above. The bronze color was achieved to match the anodized color, but first attempts in molding yielded a part with severe flow lines due to the heat staking holes and no brushed appearance (see Figure 2). The holes were then

appearance. Eliminating the painted red letters improves durability when in contact with engine fluic cleaners. Further benefits included at least a $2.50/v cost savings, a $40,000 one-time savings by not hav build painting and plating racks, and a 20 gram pe weight savings.

The all plastic molded-in-color engine badge m the appearance and part performance requirements OEM. But how was the all plastic appearance accept the consumer? A quick search on fordraptorforun found comments such as "I really think the 2019 E Cover looks so much better than the previous year "Looks awesome", or "Great looking cover", and engine cover is big improvement". From the major the comments, it appears that the new engine cove badge were a success. Figure 4 shows a picture installed final engine cover and badges.

By achieving an all plastic solution formulated the same PA6-101 resin for the red, silver and b colors, the assembly represents a sustainable so versus the initial design. We satisfied the environm pillar by using the same molded-in-color resin whic

modified to be all circular but still random in location to maintain poka-yoke. The surface of the mold was also modified with a brushed surface texture to mimic the brushed appearance of the aluminum base plate.

The second molding trials yielded a significant improvement in appearance with almost complete elimination of the visible the flow lines. The PA6 resin replicated the brushed texture in the tool to create a brushed finish very similar to the desired aluminum appearance (see Figure 3). The next iteration included

be reground, re-used, and recycled in process or end
potentially keeping the final engine badge assembly
the landfill. By eliminating the secondary proc
thereby eliminating VOCs from painting and the che
disposal associated with chrome plating and anodiz
we satisfied the social pillar by reducing human
risks. Finally, all of this was accomplished at a lowe
part cost satisfying the economic pillar.

Sustainable solutions can be rather co
developing biopolymers or compostable solutions or

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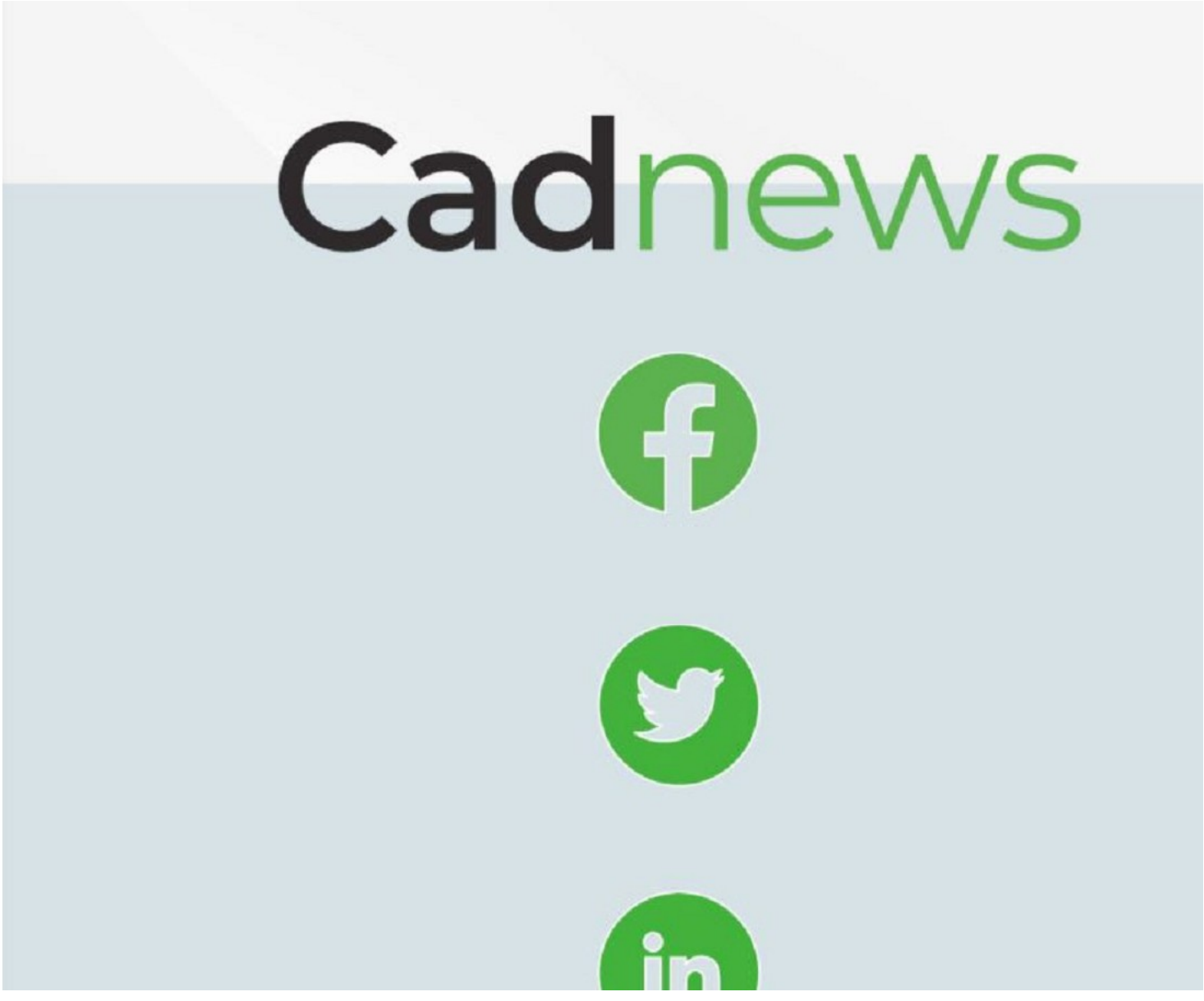

COLOR & APPEARANCE

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TRAIN, INFORM AND PROVIDE PROFESSIONAL INTERACTION OPPO
TUNITIES TO THE GLOBAL COMMUNITY INVOLVED IN VISUAL PERFO
MANCE AND AESTHETICS OF PLASTICS